PUBLIC NOTICE

FEDERAL COMMUNICATIONS COMMISSION
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THE FCC'S ADVISORY COMMITTEE FOR THE 2000 WORLD RADIOCOMMUNICATION CONFERENCE OFFERS ADDITIONAL PRELIMINARY VIEWS / PROPOSALS ON WRC-2000 ISSUES

The WRC-2000 Advisory Committee is assisting the Commission in the development of proposals for the World Radiocommunication Conference to be held in the year 2000 (WRC-2000). On December 9, 1998, (its fifth meeting) and on February 19, 1999 (its sixth meeting), the Advisory Committee proposed further preliminary views and a draft proposal on issues that are to be addressed at WRC-2000. [1] In addition, the National Telecommunications and Information Administration's (NTIA) Radio Conference Subcommittee (RCS) has submitted to the Commission a preliminary view and preliminary draft proposals that have been developed by the Executive Branch agencies. We request comments on all of these preliminary views and proposals.

Draft preliminary views and a proposal developed by the Informal Working Groups of the FCC's WRC-2000 Advisory Committee include: 1) an expansion of a previous preliminary view on additional allocations to the non-voice mobile-satellite service in the 450-470 MHz band; 2) a proposal with conclusions regarding the feasibility of mobile-satellite downlinks in the 1559-1567 MHz band; 3) an updated preliminary view addressing replanning of the spectrum for the broadcasting-satellite service and associated feeder links in ITU Regions 1 and 3; 4) a preliminary view concerning the application of the Radio Regulations Board's Rules of Procedure with respect to the broadcasting-satellite service; 5) a preliminary view on the protection of HF frequencies used by the aeronautical mobile and maritime mobile services for safety and distress communications; and 6) a preliminary view related to verification that the power flux density limits in the international Radio Regulations adequately protect terrestrial services. The complete text of these preliminary views is provided in Sections I through V below.

NTIA has provided a draft preliminary view and several proposals which have been developed by NTIA's RCS. These appear in Section VI below and consist of:
1) proposals for the Table of Maximum Spurious Emissions in Appendix S3 to the international Radio Regulations; 2) a preliminary view and proposal relating to a Mobile-Satellite Service (MSS) downlink at 1559-1567 MHz; 3) a proposal for adding a space-to-space direction to the radionavigation-satellite service allocations in the 1215-1260 and 1559-1610 MHz bands; 4) a proposal for allocations of frequency bands above 71 GHz for the earth-exploration (passive) and radio astronomy services [2]; and 5) proposals for common worldwide allocations for the earth

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[1] Previously-proposed preliminary views were presented in FCC Public Notices No. DA 98-842, released May 4, 1998, No. DA 98-1044, released June 3, 1998, No. DA 98-1125, released June 15, 1998 and No. DA 98-1560, released August 5, 1998.

[2] The document containing the proposal is too large to include in this public notice, but it is available in the FCC's International Reference Center and on the FCC's web site as indicated herein.

exploration-satellite (passive) service and protection of sensors in the 18.6-18.8 GHz band.

The complete text of all preliminary views and proposals are available in the FCC's International Reference Center, 2000 M Street, N.W., Room 102, Washington, D.C. (telephone: 202-418-1492) or by accessing the FCC's WRC-2000 world wide web site at: http://www.fcc.gov/wrc-00. To comment on the above preliminary views or proposals, please submit an original and one copy of your comments to the Chief, Planning & Negotiations Division, International Bureau, Federal Communications Commission, 2000 M Street, N.W., Suite 800, Washington, D.C. 20554. Comments should refer to the above preliminary views or proposals by document number. Parties preferring to e-mail their comments should address their comments to: wrc-99@fcc.gov. The deadline for submitting comments is March 12, 1999.

The comments provided will be of assistance to the FCC in its upcoming consultations with the U.S. Department of State, the NTIA, and other government agencies for developing and updating U.S. preliminary views. Once approved by agreement among these U.S. Government agencies, preliminary views may be used by U.S. delegations to stimulate discussion and feedback and to attempt to achieve common proposals with other countries on these issues. The proposed preliminary views set forth herein may evolve in the course of interagency discussions and therefore do not constitute a final U.S. Government position on these issues.

I. Revised Preliminary View of IWG-2 (Informal Working Group on NGSO Mobile-Satellite Service Below 1 GHz

WRC-2000 AGENDA ITEM 1.11 *to consider constraints in existing allocations and additional allocations for NGSO/MSS below 1 GHz, taking into account Resolutions 214 (Rev. WRC-97) and 219 (WRC-97); (WAC/025(19.02.99))*

ISSUE: Additional allocations to NVNG (Non-Voice Non-Geostationary) MSS (Earth-to-space) in the 450-470 MHz band.

BACKGROUND: Several allocations to NVNG MSS exist in the 450-470 MHz frequency band. 455-456 MHz and 459-460 MHz are allocated to NVNG MSS in the entire ITU-R Region 2 and in several administrations in each of Regions 1 and 3. Additionally, the frequency band 454-455 MHz is allocated to the MSS in countries in each of the three ITU-R Regions by Radio Regulations S5.286D and S5.286E. The limited allocations in these frequency bands reduce the ability of potential networks in these bands to provide the worldwide communications services of which they are inherently capable. Agenda Item 1.11 includes "… to consider additional allocations on a worldwide basis for the non-GSO/MSS below 1 GHz …."

Resolution 214 (Rev. WRC-97) invited the ITU-R to study sharing between both existing and planned terrestrial services. The studies conducted within ITU-R Study Groups for frequencies in the band 450-470 MHz have indicated that with appropriate technical and operational constraints, Earth-to-space links for NVNG MSS networks can frequency share with certain terrestrial systems currently operating or planned for operation in the band.

In *considerings b)*, Resolution 214 (Rev WRC-97) indicated that in order to meet projected MSS requirements below 1 GHz, a range of an additional 7 to 10 MHz will be required in the near future. Additions to the existing NVNG MSS allocations could partially provide the required NVNG MSS spectrum.

PRELIMINARY VIEW: ITU-R studies have shown the compatibility of NVNG MSS (Earth-to-space) allocations with certain types of terrestrial MS systems that operate in the

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450-470 MHz band, with certain technical and operational constraints on the NVNG MSS networks to facilitate co-frequency sharing with the existing services.

The U.S. supports expanding the existing NVNG MSS allocations at 454-455, 455-456, and 459-460 MHz to worldwide allocations.

II. Draft Proposal of IWG-3 (Informal Working Group on Mobile-Satellite Service Above 1 GHz (Including NGSO MSS Feeder Link Matters)/Radionavigation-Satellite Service (GPS) Matters

WRC-2000 AGENDA ITEM 1.9 *to take into account the results of ITU-R studies in evaluating the feasibility of an allocation in the space-to-Earth direction to the mobile-satellite service in a portion of the 1 559 - 1 567 MHz frequency range, in response to Resolutions 213 and 220 (WRC-97); (WAC/055(19.02.99))*

Background

Proposals were made to WRC-97 to reallocate portions of the 1 559 - 1 610 MHz band which, with the exception of a fixed service allocation in some countries, currently is exclusively allocated to the radionavigation satellite service and aeronautical radionavigation service worldwide. Other proposals were made not to change the existing allocations in these bands. In Resolution 220 (WRC-97), the ITU-R was requested to study, as a matter of urgency, the technical criteria and operational and safety requirements to determine if sharing between the aeronautical radionavigation and radionavigation-satellite services, operating or planned to be operate, in the band 1559-1610 MHz, and the mobile-satellite service in a portion of the 1559-1567 MHz frequency range, is feasible, taking into account the essential need to protect systems operating in the aeronautical radionavigation and radionavigation-satellite services in the band 1559-1610 MHz.

There are millions of RNSS receivers in use today for a wide range of applications, including safety-of-life-critical navigation on land, at sea, and in the air. Today, most of these receivers operate with the Global Positioning System (GPS), an important element of the Global Navigation Satellite System (GNSS) that operates in the 1 559 - 1 610 MHz band.

GPS provides position and time information to users by means of one-way transmissions using RNSS (space-to-Earth) allocations. GPS is information technology that uses systems of hardware and software, as well as information (time and ephemeris) transmitted from satellites to provide derived information to the user.

GLONASS and GPS are established elements of the International Civil Aviation Organization (ICAO) GNSS, operating in the band 1 559 - 1 610 MHz. These systems are accepted by the ICAO Council for use in international civil aviation. ICAO is currently developing Standards and Recommended Practices for international application in civil aviation. The GNSS will be used during all phases of flight, including precision approaches and landing, and under all weather conditions. The latter places extensive requirements on the performance characteristics of the system. The aeronautical use of RNSS is recognized in the Radio Regulations as a safety-of-life application. GPS is the sole basis for the formation of International Atomic Time and Coordinated Universal Time (UTC) by the International Bureau of Weights and Measures. GPS is also the primary means by which clocks are synchronized within telecommunications networks for

Time Division Multiple Access transmissions. Time and frequency functions are or will be available on other RNSS systems.

As Resolution **220 (WRC-97)** recognizes RNSS and ARNS systems are evolutionary and other types of GNSS are under development for operation in the band 1 559 - 1 610 MHz. There are both aeronautical and non-aeronautical safety-of-life services in the 1 559 - 1 610 MHz band, and it is well established that there is an essential need to protect systems operating in the ARNS and RNSS.

The core signal structures of the MSS and the RNSS and ARNS are fundamentally different: MSS uses a two-way signal while ARNS and RNSS transmits a weak, receive-only signal. Having systems from a radiocommunication service operate on a co-primary, co-frequency basis in the 1 559 - 1 610 MHz band would limit ARNS and RNSS operators' flexibility to adjust their spectrum usage, and would hamper efforts to develop a GNSS that is capable of meeting evolving international needs and of providing adequate protection for international civil use worldwide.

[Studies undertaken in the ITU-R have been completed, and the results of those studies have been reported to and considered by CPM-2000. The studies addressed current aeronautical radionavigation and radionavigation-satellite service systems, as well as future radionavigation services planned for this band.

CPM-2000 reached the following conclusions:

- MSS (space-to-Earth) and ARNS/RNSS are fundamentally incompatible in any portion of the 1559-1567 MHz band. Not only do MSS signals disrupt ARNS/RNSS, but GNSS pseudolites disrupt MSS signals.

- The -112 dB(W/m2/MHz) power flux-density level at the Earth's surface that is mentioned in Resolution 220 clearly would not protect existing RNSS systems (such as GPS) from harmful interference.

- The RNSS is extensively used, and is continuing to undergo a tremendous expansion which drives further evolution. These factors, along with the many critical timing, positioning, and navigation uses of RNSS sharing of the 1559-1610 MHz band, weigh conclusively against sharing any portion of the band segment at 1559-1567 MHz with any co-frequency communication service.

- The absence of characteristics of mobile-satellite service systems that would use any portion of the band 1559-1567 MHz in the space-to-Earth direction preclude a finding that sharing between the MSS (space-to-Earth) and the ARNS/RNSS is feasible.

- The use of pseudolites in the ARNS/RNSS bands at 1559-1567 MHz is in its early stages, but is expected to increase in terms of numbers, geographic scope, and complete utilization of the frequency band in the near future. This use is incompatible with co-frequency MSS (space-to-Earth).

- Not only do MSS signals have the potential to cause significant interference to ARNS and RNSS, but GNSS pseudolites and proposed new RNSS systems also have the potential to cause significant interference to the MSS (space-to-Earth).]

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On the basis of these conclusions, the following proposals are made:

PROPOSALS UNDER AGENDA ITEM 1.9:

Allocations in the 1 559 - 1 610 MHz band

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MHz
1 535 - 1 610

Allocation to Services		
Region 1	Region 2	Region 3
1 559 - 1 610 AERONAUTICAL RADIONAVIGATION RADIONAVIGATION-SATELLITE (space-to-Earth) S5.341 S5.355 S5.359 S5.363		

The United States proposes that no allocation be made to the Mobile Satellite Service (space-to-Earth) in any portion of the 1559-1567 MHz band.

Reasons: The current allocation, 1 559-1 610 MHz, is required for radionavigation services, including critical aeronautical safety applications, on a worldwide basis. Based on studies conducted in the ITU-R pursuant to Resolution 220, sharing in this band with communications services such as the mobile-satellite service (space-to-Earth) is not possible. Efforts to phase out the remaining fixed service stations operating by footnote are under way.

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~~**RESOLUTION 220 (WRC-97)**~~

~~**Studies to consider the feasibility of use of a portion of the band 1559-1610 MHz by the mobile-satellite service (space-to-Earth)**~~

Reasons: Studies performed by the ITU-R show that co-frequency sharing between the mobile-satellite service and the radionavigation-satellite and aeronautical radionavigation services within the band 1559-1567 MHz is not feasible. The ITU-R studies satisfy the requirement of Resolution 220 (WRC-97). As a result, Resolution 220 should be suppressed.

III. Preliminary View of IWG-5 (Informal Working Group on Aeronautical Mobile and Maritime Mobile Service Matters)

WRC-2000 AGENDA ITEM 1.7: *to review the use of the HF bands by the aeronautical mobile (R) and maritime mobile services with a view to protecting the operational, distress and safety communications, taking into account Resolution 346*; (WAC/044(09.12.98))

BACKGROUND: The HF bands allocated for the distress and safety communications of the Maritime and Aeronautical Mobile (R) Services have been subject to harmful interference caused by unauthorized use. This unauthorized use of safety related HF frequencies has increased in recent years and is resulting in considerable worldwide interference to the operational, distress and safety communications spectrum utilized by the maritime and aeronautical communities. Considering that radio is the sole means of communications for the aeronautical and maritime mobile services and that frequencies in the bands allocated to these services are reserved or used for distress and safety purposes and that the Aeronautical mobile (R) service is a safety service, it is of paramount importance that the distress and safety channels of the maritime mobile service and the allocations to the aeronautical mobile (R) safety service be kept free from harmful interference and unauthorized use since they are essential for the safety of life and property.

The protection of Maritime HF distress and safety frequencies, in particular the frequencies 12,290 kHz and 16,420 kHz, is addressed in Resolution 346 (WRC-97) (COM4-9). The problem of interference to distress traffic on these frequencies is due to their permitted use as calling frequencies. Resolution 346 calls for administrations to minimize the use of these frequencies for non-safety calling purposes by coast and ship stations.

The interference to HF frequencies allocated to the Aeronautical Mobile (R) Service between 2850 kHz and 22,000kHz appears to be the result of unauthorized non-aviation use of Aeronautical Mobile (R) frequencies. In some parts of the world the Aeronautical Mobile (R) HF frequencies are being used for land mobile, broadcast, fixed point to point communications and unlicensed applications to support fishing fleets. These unauthorized applications have diminished the spectrum available for the Aeronautical Mobile (R) safety of life applications.

PRELIMINARY VIEW: Administrations should ensure that stations of services other than the Aeronautical Mobile (R) and Maritime Mobile Services abstain from using frequencies in the distress and safety channels and their guard bands and in the bands allocated exclusively to either the Aeronautical Mobile (R) or the Maritime Mobile Services. That Administrations make every effort to identify and locate the source of any unauthorized emission capable of endangering human life or property and the safe and regular conduct of aircraft operations, and to take necessary measures to prevent stations from operating in contravention to the ITU Radio Regulations.

IV. Preliminary Views of IWG-6 (Informal Working Group on Appendices 30 and 30A Matters (Broadcasting-Satellite Service)

A. Updated Preliminary View

WRC-2000 AGENDA ITEM 1.19 (As adopted at the 1998 meeting of the Administrative Council): *To consider the report of the Inter-conference Representative Group (IRG) submitted by the Director of the Radiocommunication Bureau and determine the basis for replanning by the next conference so as to afford each country an amount of spectrum that permits the economic development of a broadcasting satellite system. (WAC/047(19.02.99))*

ISSUE: How should the IRG guide GTE studies to provide increased spectrum for countries in the WRC-97 BSS and associated feeder link Plans for Regions 1 and 3 in accordance with the principles set forth in Resolution 532(WRC-97).

BACKGROUND: The IRG, whose report will provide the expert advice to be considered by WRC-00 in determining the basis for revising the WRC-97 BSS Plan for Regions 1 and 3, was established by Resolution 532 (WRC-97). This Resolution calls for studies on the feasibility of increasing the capacity assigned to each country in the Regions 1 and 3 BSS and feeder link Plans and sets forth eight principles to be observed in these studies.

PRELIMINARY VIEW: The U.S. supports the objective of increasing the capacity assigned to each Region 1 and 3 country sufficiently to permit the economic development of BSS systems. The U.S. believes that a capacity equivalent to 10 analogue channels per country, as described in Principle 1 of Annex 1 to Resolution 532 (WRC-97), is appropriate for such development.

In considering alternative approaches for achieving this replanning objective, the U.S. considers it essential to take into account, not only notified assignments as described in Principle 3 of Annex 1, but also proposed modifications to the Plan that have been published and which meet the due diligence requirements of Resolution 49(WRC-97). The basis for this view is that many of these modifications will, in fact, have been notified, brought into use, and the date of bringing into use confirmed to the Bureau well before the Conference at which the Regions 1 and 3 replanning will take place. Additionally, the U.S. is of the view that the objectives of long term flexibility and of leaving capacity for future requirements (principles 4 and 5 of Annex 1 to Resolution 532) can best be achieved through the adoption of an all-digital approach, as contemplated in Principle 6 of Annex 1. We note that the number of television program channels that can be broadcast with an all-digital approach is at least five times the number of assigned analogue channels.

Finally, any possible replanning must protect Region 2 services in accordance with the current criteria of Appendices S30 and S30A, and must not introduce additional constraints upon, those services, in accordance with Principles 7 and 8 of Annex 1 to Resolution 532 (WRC-97).

B. Preliminary View

WRC-2000 AGENDA ITEM 1.19bis (As adopted at the 1998 meeting of the ITU Council): *in accordance with [Article S14], to consider objections expressed by administrations with respect to the RRB Rules of Procedure relating to the application of [RR2674/S23.13] in order for the Bureau to modify its findings in accordance with the conclusions of the conference. (WAC/048(19.02.99))*

ISSUE: Rules of Procedure associated with No. S23.13 (RR2674).

BACKGROUND: No. S23.13 (RR2674) states:

"In devising the characteristics of a space station in the broadcasting-satellite service, all technical means available shall be used to reduce, to the maximum, the radiation over the territory of other countries unless an agreement has been previously reached with such countries."

No. S23.13 (RR2674) was adopted at WARC-71. It was intended as a statement of good engineering practice to reduce BSS interference with the terrestrial services outside of the intended service area. At WRC-95, however, some countries sought to have the interpretation of No. S23.13 (RR 2674) revised to require, as a condition for registration, the approval of other countries within the service area of a BSS system proposed as a plan modification. After thorough debate, WRC-95 instructed the RRB to revise its Rules of Procedures to reflect the results of its debate. The decision reached by WRC-95 reflected a difficult compromise on the parts of all parties involved. The RRB made the revisions, but further concerns were raised at WRC-97. These concerns led WRC-97 to adopt Resolution 536 which resolves that:

in addition to observing No. S23.13/2674, and before providing satellite broadcasting services to other administrations, administrations originating the services should obtain the agreement of those other administrations.

The ITU Council at its 1998 meeting added Item 1.19 bis to the Agenda for WRC-2000.

PRELIMINARY VIEW: Agenda Item 1.19 bis has the effect of re-opening an issue that was resolved after much discussion first at WRC-95, and then at WRC-97 by the adoption of Resolution 536. There is no need to repeat the work and discussion of WRC-95 and WRC-97.

Further, the United States is concerned that re-opening this issue could compromise the principle of free flow of information contained in Article 19 of the Universal Declaration of Human Rights, which provides that: "Everyone has the right to freedom of opinion and expression; this right includes freedom to hold opinions without interference and to seek, receive and impart information and ideas through any media regardless of frontiers." The Universal Declaration of Human Rights, including Article 19 just quoted, was passed by the UN General Assembly on 10 December 1948.

V. Preliminary Views of IWG-7 (Informal Working Group on Fixed and Fixed-Satellite Service Matters

WRC-2000 AGENDA ITEM 1.4: *Verification of PFD limits in Article S21 to determine whether they protect adequately terrestrial services from FSS networks in the band 37-40 GHz, Resolution 133; (WRC-97) (WAC/049(19.02.99))*

ISSUE: Verification of PFD Limits in Art. 21 as to whether they adequately protect terrestrial services from FSS networks in the bands 37-40 GHz. (Resolution 133)

BACKGROUND: RR 2581 (S21.0) specifies that the PFD limits between 31.0 GHz and 40.5 GHz shall be as specified in RR 2578. This regulation indicates that the PFD limits shall be:

-115 dB (W/m^2) in any 1 MHz band for angles of arrival between 0 and 5 degrees

above the horizontal plane,

-115 + 0.5 (D-5) dB (W/m^2) in any 1 MHz band for angles of arrival (in degrees) between 5 and 25 degrees above the horizontal plane,

-105 dB (W/m^2) in any 1 MHz band for angles of arrival between 25 and 90 degrees above the horizontal plane.

The issue of adequacy of PFD limits is being addressed through the performance of necessary studies in WP 4/9-S.

PRELIMINARY VIEW: The U.S. Preliminary View is based on the status of the WP 4/9-S studies.

Based on preliminary CPM information from technical studies in ITU-R WP 4/9-S (TEMP/53), the current view is that the ITU power flux density limits of –115/-105 dB(W/m^2 per MHz) currently specified in the band 37.5-40.5 GHz are adequate to protect the fixed service. However, the Chairman's Report for WP 4/9-S indicates that prior to concluding on the acceptability of the pfd limits at the next WP 4-9S meeting, additional sharing studies should consider, for example:

- Other FS point-to-point systems (including systems using high modulation schemes, e.g., 256 QAM), point-to-multipoint systems and FSS systems;
- The suitability of pfd levels at high FS elevation angles;
- The propagation information contained in draft new Recommendation [4-9S/AD] (see Document 4-9S/TEMP/45(Rev.1));
- The effect of aggregate interference from multiple FSS systems.

VI. Preliminary Views and Draft Proposals of NTIA's Radio Conference Subcommittee

WRC-2000 AGENDA ITEM 1.2: *Finalize Space Service Spurious Emissions in Appendix S3; Recommendation 66 (Rev. WRC-97)* (WAC/050))

Proposals For Agenda Item 1.2
Appendix S3, Table of Maximum Permitted Spurious Emission Power Levels (See Article S3)

Background Information:

Recommendation No. 66 (Rev. WRC–97) directs the ITU-R to submit a report to **WRC-00** with a view to finalizing the space services spurious emissions limits in Appendix S3 of the Radio Regulations. The United States proposes text that would remove the "design objectives" designation from the space services spurious emissions limits and make related appropriate modifications applicable to deep-space systems, satellites with spurious emissions falling within the necessary bandwidth of another transmitter on the same satellite, and amateur earth stations below 30 MHz. Furthermore, the United States proposes to correct an oversight in Appendix S3 regarding limits for the radiodetermination service, and specify that spurious emission levels for radar systems be determined from radiated emissions.

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APPENDIX S3

Table of Maximum Permitted Spurious Emission Power Levels

(See Article **S3**)

1. The following sections indicate the maximum permitted levels of spurious emissions, in terms of power as indicated in the tables, of any spurious component supplied by a transmitter to the antenna transmission line. Section 1 is applicable until 1 January 2012 to transmitters installed on or before 1 January 2003; Section 2 is applicable to transmitters installed after 1 January 2003 and to all transmitters after 1 January 2012. This Appendix does not cover out-of-band emissions. Out-of-band emissions are dealt with in No. **S4.5** of the Radio Regulations.

2. Spurious emission from any part of the installation, other than the antenna and its transmission line, shall not have an effect greater than would occur if this antenna system were supplied with the maximum permitted power at that spurious emission frequency.

3. These levels shall not, however, apply to emergency position-indicating radiobeacon (EPIRB) stations, emergency locator transmitters, ships' emergency transmitters, lifeboat transmitters, survival craft stations or maritime transmitters when used in emergency situations.

4. For technical or operational reasons, more stringent levels than those specified may be applied to protect specific services in certain frequency bands. The levels applied to protect these services, such as safety and passive services, shall be those agreed upon by the appropriate world radiocommunication conference. More stringent levels may also be fixed by specific agreement between the administrations concerned. Additionally, special consideration of transmitter spurious emissions may be required for the protection of safety services, radio astronomy and space services using passive sensors. Information on the levels of interference detrimental to radio astronomy, Earth exploration satellites and meteorological passive sensing is given in the most recent version of Recommendation ITU-R SM.329.

5. Spurious emission limits for combined radiocommunication and information technology equipment are those for the radiocommunication transmitters.

Section I. Spurious Emission Limits for Transmitters Installed on or Before 1 January 2003 (valid until 1 January 2012)

Radar systems are exempt from spurious emission limits under this section. ~~The measurement methods for radar systems should be guided by Recommendation ITU-R M.1177. For those radar systems for which acceptable methods of measurement do not exist,~~ Tthe lowest practicable power of spurious emission should be achieved.

TABLE I

Attenuation values and absolute mean power levels used to calculate maximum permitted spurious emission power levels for use with radio equipment

Frequency band containing the assignment **(lower limit exclusive, upper limit inclusive)**	**For any spurious component, the attenuation (mean power within the necessary bandwidth relative to the mean power of the spurious component concerned) shall be at least that specified below and the absolute mean power levels given shall not be exceeded** **(Note 1)**
9 kHz to 30 MHz	40 decibels 50 milliwatts 2), 3), 4)
30 MHz to 235 MHz – mean power above 25 watts	60 decibels 1 milliwatts 5)
– mean power 25 watts or less	40 decibels 25 microwatts
235 MHz to 960 MHz – mean power above 25 watts	60 decibels 20 milliwatts 6), 7)
– mean power 25 watts or less	40 decibels 25 microwatts 6), 7)
960 MHz to 17.7 GHz – mean power above 10 watts	50 decibels 100 milliwatts 6), 7), 8), 9)
– mean power 10 watts or less	100 microwatts 6), 7), 8), 9)
Above 17.7 GHz	The lowest possible values achievable shall be employed (see Recommendation **66 (Rev.WRC-97)**).

Notes to Table I

1) When checking compliance with the provisions of the table, it shall be verified that the bandwidth of the measuring equipment is sufficiently wide to accept all significant components of the spurious emission concerned.

2) For mobile transmitters which operate below 30 MHz, any spurious component shall have an attenuation of at least 40 decibels without exceeding the value of 200 milliwatts, but every effort should be made to comply with the level of 50 milliwatts wherever practicable.

3) For transmitters of a mean power exceeding 50 kilowatts which can operate on two or more frequencies covering a frequency range approaching an octave or more, while a reduction below 50 milliwatts is not mandatory, a minimum attenuation of 60 decibels shall be provided.

4) For hand-portable equipment of mean power less than 5 watts, the attenuation shall be 30 decibels, but every practicable effort should be made to attain 40 decibels attenuation.

5) Administrations may adopt a level of 10 milliwatts provided that harmful interference is not caused.

6) Where several transmitters feed a common antenna or closely spaced antennas on neighbouring frequencies, every practicable effort should be made to comply with the levels specified.

7) Since these levels may not provide adequate protection for receiving stations in the radio astronomy and space services, more stringent levels might be considered in each individual case in the light of the geographical position of the stations concerned.

8) These levels are not applicable to systems using digital modulation techniques, but may be used as a guide. Values for these systems may be provided by the relevant ITU-R Recommendations, when available (see Recommendation **66 (Rev.WRC 97)**).

9) These levels are not applicable to stations in the space services, but the levels of their spurious emissions should be reduced to the lowest possible values compatible with the technical and economic constraints to which the equipment is subject. Values for these systems may be provided by the relevant ITU-R Recommendations, when available (see Recommendation **66 Rev.WRC-97)**).

Section II. Spurious Emission Limits for Transmitters Installed After 1 January 2003 and for All Transmitters After 1 January 2012

Application of these limits

7. The frequency range of the measurement of spurious emissions is from 9 kHz to 110 GHz or the second harmonic if higher.

8. Guidance regarding the methods of measuring spurious emissions is given in the most recent version of Recommendation ITU-R SM.329. The e.i.r.p. method specified in that Recommendation should be used when it is not possible to measure the power supplied to the antenna transmission line , or where it is more appropriate, due to the antenna signal attenuation characteristics . Additionally, the e.i.r.p. method may need some modification for special cases, e.g. beam-forming radars.

9. Guidance regarding the methods of measuring spurious emissions from radar systems is given in the most recent version of Recommendation ITU-R M.1177. The reference bandwidths required for proper measurement of radar spurious emissions should be calculated for each particular radar system. Thus, for the three general types of radar pulse modulation utilized for radionavigation, radiolocation, acquisition, tracking and other radiodetermination functions, the reference bandwidth values should be:

– for fixed-frequency, non-pulse-coded radar, one divided by the radar pulse length, in seconds (e.g. if the radar pulse length is 1 microsecond, then the reference bandwidth is 1/1µs = 1 MHz);

– for fixed-frequency, phase coded pulsed radar, one divided by the phase chip length, in seconds (e.g. if the phase coded chip is 2 microseconds long, then the reference bandwidth is 1/2µs = 500 kHz);

– for frequency modulated (FM) or chirped radar, the square root of the quantity obtained by dividing the radar bandwidth in MHz by the pulse length, in seconds (e.g. if the FM is from 1 250 to 1 280 MHz or 30 MHz during the pulse of 10 microseconds, then the reference bandwidth is $(30 \text{ MHz}/10\mu\text{s})^{1/2} = 1.73$ MHz).

For those radar systems for which acceptable methods of measurement do not exist, the lowest practicable power of spurious emission should be achieved.

10. The spurious emission levels are specified in the following reference bandwidths:

– 1 kHz between 9 kHz and 150 kHz

– 10 kHz between 150 kHz and 30 MHz

– 100 kHz between 30 MHz and 1 GHz

– 1 MHz above 1 GHz

As a special case, the reference bandwidth of all space service spurious emissions should be 4 kHz.

11. For the purpose of setting limits, all emissions, including harmonic emissions, intermodulation products, frequency conversion products and parasitic emissions, which fall at frequencies separated from the centre frequency of the emission by ±250%, or more, of the necessary bandwidth of the emission will generally be considered as spurious emissions. However, this frequency separation may be dependent on the type of modulation used, the maximum bit rate in the case of digital modulation, the type of transmitter and frequency coordination factors. For example, in the case of digital (including digital broadcasting) modulation systems, broadband systems, pulsed modulation systems and narrow-band high power transmitters, the frequency separation may need to differ from the ±250% factor. For multichannel or multicarrier transmitters/transponders, where several carriers may be transmitted simultaneously from a final output amplifier or an active antenna, the centre frequency of the emission is taken to be the centre of the –3 dB bandwidth of the transmitter or transponder and the necessary bandwidth is taken to be the transmitter or transponder bandwidth.

11bis. For satellites employing more than one transponder, spurious emission limits do not apply to those emissions that fall within the necessary bandwidth of another transmitter on the same satellite.

Where specified in relation to mean power, spurious emissions are to be at least x dB below the total mean power *P*, i.e. –x dBc. The power *P* (in watts) is to be measured in a bandwidth wide enough to include the total mean power. The spurious emissions are to be measured in the reference bandwidths given in the Recommendation. The measurement of the spurious emission power is independent of the value of necessary bandwidth. Because the absolute emission power limit, derived from 43 + 10 log (*P*), can become too stringent for high-power transmitters, alternative relative powers are also provided in Table II.

Example 1

A land mobile transmitter, with any value of necessary bandwidth, must meet a spurious emission attenuation of 43 + 10 log (*P*), or 70 dBc, whichever is less stringent. To measure spurious emissions in the frequency range between 30 MHz and 1 000 MHz, Recommendation ITU-R SM.329-7 *recommends* 4.1 indicates the use of a reference bandwidth of 100 kHz. For other frequency ranges, the measurement must use the appropriate reference bandwidths given in *recommends* 4.1.

With a measured total mean power of 10 watts:

– Attenuation relative to total mean power = 43 + 10 log (10) = 53 dBc.

– The 53 dBc is less stringent than 70 dBc, so the 53 dBc value is used.

– Therefore: Spurious emissions must not exceed 53 dBc in a 100 kHz bandwidth, or converting to an absolute level, spurious emissions must not exceed 10 dBW – 53 dBc = –43 dBW in a 100 kHz reference bandwidth.

With a measured total mean power of 1 000 watts:

– Attenuation relative to total mean power = 43 + 10 log (1 000) = 73 dBc.

– The 73 dBc is more stringent than 70 dBc limit, so the 70 dBc value is used.

– Therefore: Spurious emissions must not exceed 70 dBc in a 100 kHz bandwidth, or converting to an absolute level, spurious emissions must not exceed 30 dBW – 70 dBc = –40 dBW in a 100 kHz reference bandwidth.

Example 2

A space service transmitter with any value of necessary bandwidth must meet a spurious emission attenuation of 43 + 10 log (*P*), or 60 dBc, whichever is less stringent. To measure spurious emissions at any frequency, Note 1 to Table II indicates using a reference bandwidth of 4 kHz.

With a measured total mean power of 20 watts:

– Attenuation relative to total mean power = 43 + 10 log (20) = 56 dBc.

– The 56 dBc is less stringent than the 60 dBc limit, so the 56 dBc value is used.

– Therefore: Spurious emissions must not exceed 56 dBc in a 4 kHz reference bandwidth, or converting to an absolute level, spurious emissions must not exceed 13 dBW – 56 dBc = –43 dBW in a 4 kHz reference bandwidth.

TABLE II

Attenuation values used to calculate maximum permitted spurious emission power levels for use with radio equipment

Service category in accordance with Article S1**, or equipment type**[15)]	**Attenuation (dB) below the power supplied to the antenna transmission line**
All services except those services quoted below:	43 + 10 log (*P*), or 70 dBc, whichever is less stringent
Space services (earth stations)[10), ~~14)~~, 16]	43 + 10 log (*P*), or 60 dBc, whichever is less stringent
Space services (space stations)[10), ~~14)~~, 17]	43 + 10 log (*P*), or 60 dBc, whichever is less stringent
Radiodetermination [14)]	43 + 10 log (*PEP*), or 60 dB, whichever is less stringent
Broadcast television [11)]	46 + 10 log (*P*), or 60 dBc, whichever is less stringent, without exceeding the absolute mean power level of 1 mW for VHF stations or 12 mW for UHF stations. However, greater attenuation may be necessary on a case by case basis.
Broadcast FM	46 + 10 log (*P*), or 70 dBc, whichever is less stringent; the absolute mean power level of 1 mW should not be exceeded
Broadcasting at MF/HF	50 dBc; the absolute mean power level of 50 mW should not be exceeded
SSB from mobile stations [12)]	43 dB below *PEP*
Amateur services operating below 30 MHz (including with SSB) [12), 16)]	43 + 10 log (*PEP*), or 50 dB, whichever is less stringent

TABLE II (*END*)

Service category in accordance with Article S1**, or equipment type**[15)]	**Attenuation (dB) below the power supplied to the antenna transmission line**

Services operating below 30 MHz, except space, radiodetermination, broadcast, those using SSB from mobile stations, and amateur [12)]	43 + 10 log (X), or 60 dBc, whichever is less stringent, where $X = PEP$ for SSB modulation, and $X = P$ for other modulation
Low-power device radio equipment [13)]	56 + 10 log (P), or 40 dBc, whichever is less stringent
Emergency position-indicating radio beacon Emergency locator transmitter Personal location beacon Search and rescue transponder Ship emergency, lifeboat and survival craft transmitters Land, aeronautical or maritime transmitters when used in emergency	No limit

P: mean power in watts supplied to the antenna transmission line, in accordance with No. **S1.158**. When burst transmission is used, the mean power *P* and the mean power of any spurious emissions are measured using power averaging over the burst duration.

PEP: peak envelope power in watts supplied to the antenna transmission line, in accordance with No. **S1.157**.

dBc: decibels relative to the unmodulated carrier power of the emission. In the cases which do not have a carrier, for example in some digital modulation schemes where the carrier is not accessible for

Notes to Table II

10) Spurious emission limits for all space services are stated in a 4 kHz reference bandwidth.

11) For analogue television transmissions, the mean power level is defined with a specified video signal modulation. This video signal has to be chosen in such a way that the maximum mean power level (e.g. at the video signal blanking level for negatively modulated television systems) is supplied to the antenna transmission line.

12) All classes of emission using SSB are included in the category "SSB".

13) Low-power radio devices having a maximum output power of less than
100 mW and intended for short-range communication or control purposes; such equipment is in general exempt from individual licensing.

14) ~~These values are "design objectives". This note will not be applicable after the 1999 World Radiocommunication Conference.~~Radar system spurious emission levels shall be determined for radiated emission levels, not at the antenna transmission line. The measurement methods for determining the radiated spurious emission levels from the radar systems should be guided by Recommendation ITU–R M.1177.

15) In some cases of digital modulation (including digital broadcasting), broadband systems, pulsed modulation and narrow-band high-power transmitters for all categories of services, there may be difficulties in meeting limits close to ±250% of the necessary bandwidth.

16) Limits for amateur earth stations operating below 30 MHz are those applied to "Amateur services operating below 30 MHz (including SSB)."

17) *Deep Space* space station systems are exempt from spurious emission limits.

Reasons: Recommendation No. 66 (Rev. WRC–97) directs the ITU-R to submit a report to WRC–99 [00] with a view to finalizing the space services spurious emissions limits in Appendix S3 of the Radio Regulations. The United States proposes to confirm the values in Table II and "clean up" the table by removing the "design objectives" designation from the space services spurious emissions limits. Furthermore, by clarifying the exemption of radar systems from the Section I limits, the United States proposes to correct an oversight in Appendix S3 regarding limits for the radiodetermination service that may lead incorrectly to the application of the Section I limits to radars. Also, the United States proposes to clarify the application of the e.i.r.p. measurement method to radars particularly, but also to other systems where antenna line measurements may not be appropriate.

WRC-2000 AGENDA ITEM 1.9: *to take into account the results of ITU-R studies in evaluating the feasibility of an allocation in the space-to-Earth direction to the mobile-satellite service (MSS) in a portion of the 1 559 - 1 567 MHz frequency range, in response to Resolutions* ***213 (WRC-97)*** *and* ***220 (WRC-97)*** *(WAC/051(17.12.98))*

PRELIMINARY VIEW:

ISSUE: Mobile-Satellite Service (MSS) downlink at 1559-1567 MHz

BACKGROUND: The band 1559-1610 MHz is allocated to Radionavigation Satellite Service (RNSS) and the Aeronautical Radionavigation Service (ARNS). An objective of the United States, as well as the International Civil Aviation Organization (ICAO), is the implementation of a global navigation satellite system (GNSS) that can support aeronautical safety in all phases of flight. The implementation of GNSS will require use of the 1559-1610 MHz band, which is the sole band currently identified to meet present and future requirements of GNSS and its augmentations. A principal component of GNSS operating in this band today is Global Position System (GPS), a navigation satellite constellation providing a worldwide free-of-charge utility that is being used increasingly for critical radionavigation, geolocation and timing functions. GPS will be an element of GNSS. There are many types of GPS receivers and applications, including aeronautical radionavigation for all phases of flight, maritime, and uses on land such as surveying, automobiles and scientific investigations. Systems that augment GPS in critical applications are developing. Some of these systems are planned to operate using frequencies in the lower end of the 1559-1610 MHz band. These systems would be blocked by a Mobile-Satellite Service (MSS) allocation. In addition, there are new RNSS systems being proposed that would operate in the 1559-1567 MHz band, such as the European Space Agency's, European Navigation Satellite System.

WRC-97 adopted RES 220 in response to a proposal to add an allocation to the 1559-1567 MHz band for the Mobile-Satellite Service. ITU-R WP8D has been tasked with performing studies to determine if sharing between MSS and ARNS and RNSS is feasible. The ITU Radio Regulation S4.10 states “Members recognize that the safety aspects of radionavigation and other safety services require special measures to ensure their freedom from harmful interference; it is necessary therefore to take this factor into account in the assignment and use of frequencies.” The United States is working in WP8D and ICAO to document GPS requirements and the requirements for new systems in this band. Studies are largely completed to determine interference requirements of a broad range of GPS receivers covering safety and non-safety applications.

Further work is planned for the next WP8D meeting.

PRELIMINARY VIEW: Based on present and future requirements of the radionavigation satellite services and in particular civil aviation, there is a need to retain the 1559-1610 MHz band for exclusive use by ARNS and the RNSS. Accordingly, the United States opposes any proposed MSS allocation in the 1559-1610 MHz band, and recommends suppression of Res. 220. **(19Jan99)**

PRELIMINARY DRAFT PROPOSALS:

Background: The frequency range under consideration, 1 559 to 1 567 MHz, is allocated on a co-primary basis to Radionavigation Satellite Service (RNSS) (space to Earth) and Aeronautical Radionavigation Service (ARNS.) Additionally, the band is allocated to the Fixed Service (FS) in some countries.

There are millions of RNSS receivers in use today for a wide range of applications, including safety-of-life-critical navigation on land, at sea, and in the air. Today, most of these receivers operate with the Global Positioning System (GPS), an important element of the Global Navigation Satellite System (GNSS) that operates in the 1 559 - 1 610 MHz band.

GPS provides position and time information to users by means of one-way transmissions using RNSS (space-to-Earth) allocations. GPS is information technology that uses systems of hardware and software, as well as information (time and ephemeris) transmitted from satellites to provide derived information to the user.

GLONASS and GPS are established elements of the International Civil Aviation Organization (ICAO) GNSS, operating in the band 1 559 - 1 610 MHz. These systems are accepted by the ICAO Council for use in international civil aviation. ICAO is currently developing Standards and Recommended Practices for international application in civil aviation. The GNSS will be used during all phases of flight, including precision approaches and landing, and under all weather conditions. The latter places extensive requirements on the performance characteristics of the system. The aeronautical use of RNSS is recognized in the Radio Regulations as a safety-of-life application. GPS is the sole basis for the formation of International Atomic Time and Coordinated Universal Time (UTC) by the International Bureau of Weights and Measures. GPS is also the primary means by which clocks are synchronized within telecommunications networks for Time Division Multiple Access transmissions. Time and frequency functions are or will be available on other RNSS systems.

As Resolution **220 (WRC-97)** recognizes RNSS and ARNS systems are evolutionary and other types of GNSS are under development for operation in the band 1 559 - 1 610 MHz. There are both aeronautical and non-aeronautical safety-of-life services in the 1 559 - 1 610 MHz band, and it is well established that there is an essential need to protect systems operating in the ARNS and RNSS.

The core signal structures of the MSS and the RNSS and ARNS are fundamentally different: MSS uses a two-way signal while ARNS and RNSS transmits a weak, receive-only signal. Having systems from a radiocommunication service operate on a co-primary, co-frequency basis in the 1 559 - 1 610 MHz band would limit ARNS and RNSS operators' flexibility to adjust their spectrum usage, and would hamper efforts to develop a GNSS that is capable of meeting evolving international needs and of providing adequate protection for international civil use worldwide.

Studies conducted in the ITU-R indicate the incompatibility of the MSS (space-to-Earth) and ARNS and RNSS in any portion of the 1 559 - 1 567 MHz band. Not only do MSS signals have the potential to cause significant interference to ARNS and RNSS, but GNSS pseudolites and proposed new RNSS systems also have the potential to cause significant interference to the MSS (space-to-Earth).

Proposal:

USA/ / 1
NOC

The United States proposes that no allocation be made to the Mobile Satellite Service in the 1559-1567 MHz band.
Reasons: The mobile satellite service is not compatible with RNSS and ARNS use of the 1559-1567 MHz band.

USA/ / 2
SUP

~~**RESOLUTION 220 (WRC-97)**~~
~~**Studies to consider the feasibility of use of a portion of the band 1 559-1 610 MHz by the mobile-satellite service (space-to-Earth)Suppress WRC-97 Resolution 220**~~

Reasons: Studies performed by the ITU-R show that MSS systems are incompatible with GNSS; therefore, sharing of the band 1559-1567 MHz is not feasible. These studies satisfy the requirement of Resolution 220; therefore Res. 220 should be deleted.

WRC-2000 Agenda Item 1.15.2: *to consider the addition of the space-to-space direction to the radionavigation-satellite service allocations in the bands 1 215 -1 260 and 1 559 - 1610 MHz* (WAC/051(29.01.99)

Background: Radionavigation-Satellite Service (RNSS) systems such as the Global Positioning System and Global Navigation Satellite System are primarily being used in the space-to-Earth direction to provide service to terrestrial users. These systems are, however, also increasingly being used in the space-to-space direction by spaceborne users for such applications as spacecraft three-dimensional positioning and velocity determination; three-axis attitude control; precise time synchronization; precision orbit determination, and atmospheric science. The use of RNSS signals is presently protected only through a space-to-Earth allocation in the 1 215 - 1 260 and 1 559 - 1 610 MHz bands. Recognizing current and future operational usage of spaceborne RNSS receivers for scientific and commercial applications, it is important to add the space-to-space direction to the existing RNSS allocations so that these uses can be taken into consideration when changes to the use of these bands are contemplated.
Interference studies have been conducted to assess the sensitivity of spaceborne RNSS receivers to interference from radiolocation, Earth exploration-satellite (active), space research (active), fixed, mobile and aeronautical radionavigation services in the 1 215 - 1 260 MHz band; from the aeronautical radionavigation and fixed services in the 1 559 - 1 610 MHz band; and also their sensitivity to intra-service interference between radionavigation satellite service systems in these two bands.

The ITU-R has concluded that the addition of a space-to-space direction to the 1 215 - 1 260 MHz and 1 559 - 1 610 MHz RNSS bands will not cause any additional interference to other services since it involves no change to the space-to-Earth transmissions.

Studies demonstrate that RNSS spaceborne receivers can operate satisfactorily in the presence of interference caused by systems in other services as well as other RNSS systems. Potential interference from services in adjacent bands was also examined.

Existing coordination procedures are adequate for space-to-space operations.

Proposal

MHz
1 215 – 1 260

	Allocation to Services		
	Region 1	Region 2	Region 3
USA/ / 3 MOD	**1 215-1 240**	EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) SPACE RESEARCH (active) S5.329 S5.330 S5.331 S5.332	
USA/ / 4 MOD	**1 240-1 260**	EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) SPACE RESEARCH (active) Amateur S5.329 S5.330 S5.331 S5.332 S5.334 S5.335	

Reasons: Provide an allocation for space-to-space use for RNSS, which will ensure the protection of space-based RNSS receivers.

MHz
1 559 – 1 610

	Allocation to Services		
	Region 1	Region 2	Region 3
USA/ / 5 MOD	**1 559 – 1 610**	AERONAUTICAL RADIONAVIGATION RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) S5.341 S5.355 S5.359 S5.363	

Reasons: Provide an allocation for space-to-space use for RNSS, which will ensure the protection of space-based RNSS receivers.

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AGENDA ITEM 1.16: *to consider the allocations of frequency bands above 71 GHz to the earth exploration-satellite (passive) and radio astronomy services, taking into account Resolution 723(WRC-97); (WAC-041(9.12.98))*

NTIA has drafted preliminary proposed changes to the frequency allocation table (71-275 GHz) to accommodate the earth exploration satellite (passive) and radio astronomy services and includes a draft resolution concerning the use of the bands by the radio astronomy service and an analysis of proposals for the passive services.

Note: The draft preliminary proposal is not included here because of its size. A copy of this document is available in the FCC's International Reference Center and at the FCC's WRC-2000 web site listed in this public notice.

AGENDA ITEM 1.17: *to consider possible worldwide allocation for the earth exp;oration-satellite (passive) service in the band 18.6 - 18.8 GHz, taking into account the results of the ITU-R studies; (WAC/042(05.10.98))*

Background Information:

At present, the allocations for the Earth exploration-satellite (passive) and the space research (passive) services in the band 18.6 - 18.8 GHz are on a primary basis in Region 2, but on a secondary basis in Regions 1 and 3. This allocation must be upgraded to primary status if the long-term ability to obtain environmental data with passive spaceborne sensors is to be preserved. Compatibility between the passive sensors and the fixed and fixed-satellite services requires adoption of constraints on the parameters of the fixed and fixed-satellite systems that use the band. A pfd limit of [-101] dBW/m^2 in a reference bandwidth of 200 MHz on systems in the fixed-satellite service will enable passive sensors to perform their mission if measurements are restricted to portions of the sensor orbit where the sensor is moving away from the equator. A limit of [-3] dBW on the power in the 18.6 - 18.8 GHz band that is delivered to an antenna of a fixed service station with a [-10] dBi backlobe gain will enable sharing with the fixed service.

Proposal:

USA/ /1
MOD

GHz

18.6 – 18.8

Allocation to Services		
Region 1	Region 2	Region 3
18.6 – 18.8 EARTH EXPLORATION-SATELLITE (passive) FIXED FIXED-SATELLITE (space-to-Earth) **MOD** S5.523 MOBILE except aeronautical mobile ~~Earth Exploration-Satellite (passive)~~ Space Research (passive) **MOD** S5.522	**18.6 – 18.8** EARTH EXPLORATION-SATELLITE (passive) FIXED FIXED-SATELLITE (space-to-Earth) **MOD** S5.523 MOBILE except aeronautical mobile SPACE RESEARCH (passive) **MOD** S5.522	**18.6 – 18.8** EARTH EXPLORATION-SATELLITE (passive) FIXED FIXED-SATELLITE (space-to-Earth) **MOD** S5.523 MOBILE except aeronautical mobile ~~Earth Exploration-Satellite (passive)~~ Space Research (passive) **MOD** S5.522

Reasons: To establish a common worldwide primary allocation to the Earth exploration-satellite (passive) services to be used for environmental measurements.

USA/ / 2
MOD

S5.522 ~~In making assignments to stations in the fixed and mobile services, administrations are invited to take account of passive sensors in the Earth exploration-satellite and space research services operating in the band 18.6 - 18.8 GHz. In this band, administrations should endeavour to limit as far as possible both the power delivered by the transmitter to the antenna and the e.i.r.p. in order to reduce the risk of interference to passive sensors to the minimum.~~ In the band 18.6 - 18.8 GHz, fixed and mobile service stations shall be limited to a total power delivered to each antenna of [-3] dBW.

Reasons: To enable passive sensors and the fixed service to operate in the band without excessive interference to the sensors.

USA/ / 3
MOD

S5.523 ~~In assigning frequencies to stations in the fixed-satellite service in the direction space-to-Earth, administrations are requested to limit as far as practicable the power flux-density at the Earth's surface in the band 18.6 - 18.8 GHz, in order to reduce the risk of interference to passive sensors in the earth exploration-satellite and space research services.~~ In the band 18.6 - 18.8 GHz, the fixed-satellite service shall be limited to a power flux density at the Earth's surface of [-101] dBW/m^2 in a reference bandwidth of 200 MHz for all angles of arrival.

Reasons: To enable passive sensors and the fixed-satellite service to operate in the band without excessive interference to the sensors.

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